

WHAT IS CLAIMED IS:

1. An adaptive motion estimation method, the motion estimation method comprising the steps of:

(a) inputting a frame in units of macro blocks and a search area, and estimating candidate motion vectors for a macro block desired to be estimated; and

5 (b) if an error of the candidate motion vectors estimated in step (a) is in a threshold range, estimating motion in a restricted search area centered on the estimated location, and otherwise, estimating motion in the whole of said search area.

2. The motion estimation method of claim 1, wherein a zero motion vector, a median of motion vectors of neighboring macro blocks, and a value estimated from the previous or next frame are generated, and a candidate motion vector is obtained by selecting a
5 value best matching the macro block desired to be estimated, among the three values.

3. The motion estimation method of claim 1, wherein step (b) further comprises the sub-steps of:

(b-1) if an error of the estimated candidate motion vector is within the threshold range, performing a one-pixel greedy search (OPGS) algorithm; and

5 (b-2) otherwise, performing a hierarchical search block matching algorithm (HSBMA).

4. The motion estimation method of claim 1, wherein the threshold in step (b) is adjusted by estimating an encoding time for the current frame at each slice unit corresponding to the macro block group, based on a target encoding time calculated in advance.

5. The motion estimation method of claim 3, wherein by using a spiral search in step (b-2), the HSBMA compares a motion vector matching degree with an allowable error range selected according to an estimated encoding time among preset thresholds at each search stage, and selects the compared value within said range as a motion vector.

6. An adaptive motion estimation apparatus, comprising:

a vector estimation unit for receiving video data, and estimating a motion vector for a macro block desired to be estimated, by selecting from among a zero motion vector, the previous motion vector, and motion vectors of neighboring blocks, as a candidate motion

vector;

an algorithm selecting unit for selecting a motion estimation algorithm by comparing an error between the candidate vector and a preset threshold; and

a motion estimation unit for estimating motion within a restricted search area, centered on an estimated location, if an error in the candidate motion vector is in a threshold range, and otherwise, estimating motion in a whole search area.

7. The motion estimation apparatus of claim 6, further comprising:

a half pixel motion estimation unit for estimating half pixel motion, referring to the location of the estimated value estimated by the motion estimation unit.